I/WE CLAIM:

1. A gas discharge laser having a laser gas containing fluorine comprising:

a first and a second elongated gas discharge electrode;

the first and the second elongated gas discharge electrodes facing each other to form a gas discharge region between the first and the second elongated gas discharge electrodes:

the first elongated gas discharge electrode connected to a voltage and insulatedly mounted to a housing wall, the housing wall being at a common potential;

the second elongated gas discharge electrode being at the common potential mounted on a second elongated gas discharge electrode mounting member; and,

a plurality of current return tangs connected between the housing wall and the second elongated gas discharge electrode mounting member along a longitudinal length of the first and second elongated gas discharge electrodes extending for less than the respective length of the second elongated gas discharge electrode.

2. The apparatus of claim 1 further comprising:

the extension of the plurality of current return tangs along the respective length of the second gas discharge electrode is terminated sufficiently far from the ends of the second elongated gas discharge electrode to prevent differentially faster erosion of the respective first and second elongated gas discharge electrodes in comparison to the remainder of the respective first and second elongated gas discharge electrodes.

3. The apparatus of claim 1 further comprising:

the extension of the plurality of current return tangs along the respective length of the second gas discharge electrode is terminated sufficiently far from the respective end of the second elongated gas discharge electrode to modify the inductance influence on the electric fields generated between the first and second elongated gas discharge electrodes in the region of the respective end of the second elongated gas discharge electrode, thereby modifying the shape of the discharge in the region of the end of the second elongated gas discharge electrode.

4. The apparatus of claim 1 further comprising:

the first current return tang being positioned along the longitudinal axis of the second gas discharge electrode just beyond the point where expanded gas discharge erosion is observed in a system without removal of any of the current return tangs.

5. The apparatus of claim 2 further comprising:

the first current return tang being positioned along the longitudinal axis of the second gas discharge electrode just beyond the point where expanded gas discharge erosion is observed in a system without removal of any of the current return tangs.

6. The apparatus of claim 2 further comprising:

the first current return tang being positioned along the longitudinal axis of the second gas discharge electrode just beyond the point where expanded gas discharge erosion is observed in a system without removal of any of the current return tangs.

7. A gas discharge laser comprising:

a first elongated gas discharge electrode;

a second elongated gas discharge electrode;

the first and second elongated gas discharge electrodes oppositely facing each other forming a gas discharge region between the first and the second elongated gas discharge electrodes;

a discharge power supply connected across the first and second elongated gas discharge electrodes periodically providing a discharge voltage to create a gas discharge in the gas discharge region;

a first discharge shaping magnet mounted in the first elongated gas discharge electrode; and,

a second discharge shaping magnet mounted in the second elongated gas discharge electrode.

8. The apparatus of claim 7 further comprising:

the first discharge shaping magnet mounted transversely to the gas discharge region with a first pole facing one side of the gas discharge region; and,

the second discharge shaping magnet mounted transversely to the gas discharge region with a second opposite pole facing the one side of the gas discharge region.

9. The apparatus of claim 7 further comprising:

at least one of the first and second discharge shaping magnets is a rare earth magnet.

10. The apparatus of claim 8 further comprising:

at least one of the first and second discharge shaping magnets is a rare earth magnet.

11. The apparatus of claim 7 further comprising:

at least one of the first and second gas discharge electrodes has imbedded therein a first and a second auxiliary field creating magnet.

12. The apparatus of claim 8 further comprising:

at least one of the first and second gas discharge electrodes has imbedded therein a first and a second auxiliary field creating magnet.

13. The apparatus of claim 9 further comprising:

at least one of the first and second gas discharge electrodes has imbedded therein a first and a second auxiliary field creating magnet.

10. The apparatus of claim 10 further comprising:

at least one of the first and second gas discharge electrodes has imbedded therein a first and a second auxiliary field creating magnet.

11. A gas discharge laser comprising a laser gas containing fluorine, comprising:

an elongated gas discharge electrode comprising:

an elongated electrode body having a centerline axis;

a pair of side walls on either side of the centerline axis;

a pair of end walls transverse to the centerline axis;

a crown straddling the centerline axis between the pair of side walls and the pair of end walls, comprising a first material, forming at least a portion of the discharge region of the electrode;

a pair of elongated high erosion regions on either side of the crown comprising a second material with a relatively higher erosion rate during gas discharge than that of the first material.

12. The apparatus of claim 11 further comprising:

the second material is chose from a group of high erosion rate alloys.

13. The apparatus of claim 11 further comprising:

the second material is chosen from a group including materials comprising high zinc alloys, high tin alloys, glidcop, indium and aluminum.

14. The apparatus of claim12 further comprising:

the second material is chosen from a group including materials comprising high zinc alloys, high tin alloys, glidcop, indium and aluminum.

15. The apparatus of claim 11 further comprising:

the first material comprising copper or copper alloy.

16. The apparatus of claim 12 further comprising:

the first material comprising copper or copper alloy.

17. The apparatus of claim 13 further comprising:

the first material comprising copper or copper alloy.

18. The apparatus of claim 14 further comprising:

the first material comprising copper or copper alloy.

19. The apparatus of claim 15 further comprising:

the first material is bonded to the second material by a process that creates a differential composition but single piece material.

20. The apparatus of claim 16 further comprising:

the first material is bonded to the second material by a process that creates a differential composition but single piece material.

21. The apparatus of claim 17 further comprising:

the first material is bonded to the second material by a process that creates a differential composition but single piece material.

22. The apparatus of claim 18 further comprising:

the first material is bonded to the second material by a process that creates a differential composition but single piece material.

23. The apparatus of claims 19 further comprising:

the first material is bonded t the second material by a process selected from the group of diffusing bonding, explosion bonding, cladding, ultrasonic welding and galvanizing.

24. The apparatus of claims 20 further comprising:

the first material is bonded t the second material by a process selected from the group of diffusing bonding, explosion bonding, cladding, ultrasonic welding and galvanizing.

25. The apparatus of claims 21 further comprising:

the first material is bonded t the second material by a process selected from the group of diffusing bonding, explosion bonding, cladding, ultrasonic welding and galvanizing.

26. The apparatus of claims 22 further comprising:

the first material is bonded t the second material by a process selected from the group of diffusing bonding, explosion bonding, cladding, ultrasonic welding and galvanizing.

27. The apparatus of claim 15 further comprising:

the high erosion regions are formed by creating a channel on either side of the crown and filling each channel with a molten form of the second material and machining the shape of the second material after if hardens.

28. The apparatus of claim 16 further comprising:

the high erosion regions are formed by creating a channel on either side of the crown and filling each channel with a molten form of the second material and machining the shape of the second material after if hardens.

29. The apparatus of claim 17 further comprising:

the high erosion regions are formed by creating a channel on either side of the crown and filling each channel with a molten form of the second material and machining the shape of the second material after if hardens.

30. The apparatus of claim 18 further comprising:

the high erosion regions are formed by creating a channel on either side of the crown and filling each channel with a molten form of the second material and machining the shape of the second material after if hardens.

31. The apparatus of claim 15, further comprising:

the high erosion regions comprise an annealed brass allow with a high zinc content.

32. The apparatus of claim 16, further comprising:

the high erosion regions comprise an annealed brass allow with a high zinc content.

33. The apparatus of claim 17, further comprising:

the high erosion regions comprise an annealed brass allow with a high zinc content.

34. The apparatus of claim 18, further comprising:

the high erosion regions comprise an annealed brass allow with a high zinc content.

35. The apparatus of claim 31, further comprising:

the annealed brass alloy is chosen from the group comprising:

C26000, C27000 and C28000.

36. The apparatus of claim 32, further comprising:

the annealed brass alloy is chosen from the group comprising:

C26000, C27000 and C28000.

37. The apparatus of claim 33, further comprising:

the annealed brass alloy is chosen from the group comprising:

C26000, C27000 and C28000.

38. The apparatus of claim 34, further comprising:

the annealed brass alloy is chosen from the group comprising:

C26000, C27000 and C28000.

39. The apparatus of claim 31 further comprising:

the annealed brass alloy is annealed at temperatures in excess of 1200F.

40. The apparatus of claim 32 further comprising:

the annealed brass alloy is annealed at temperatures in excess of 1200F.

41. The apparatus of claim 33 further comprising:

the annealed brass alloy is annealed at temperatures in excess of 1200F.

42. The apparatus of claim 34 further comprising:

the annealed brass alloy is annealed at temperatures in excess of 1200F.

43. The apparatus of claim 31 further comprising:

the annealed brass alloy comprises:

a thin film of zinc on the surface of the annealed brass alloy.

44. The apparatus of claim 32 further comprising:

the annealed brass alloy comprises:

a thin film of zinc on the surface of the annealed brass alloy.

45. The apparatus of claim 33 further comprising:

the annealed brass alloy comprises:

a thin film of zinc on the surface of the annealed brass alloy.

46. The apparatus of claim 34 further comprising:

the annealed brass alloy comprises:

a thin film of zinc on the surface of the annealed brass alloy.

47. A laser electrode comprising:

an electrode body comprising an electrically conductive material having a first coefficient of thermal conductivity;

a first insert in the electrode body comprising an electrically conductive material having a second coefficient of thermal conductivity;

the second coefficient of thermal conductivity being substantially greater than the first coefficient of thermal conductivity.

48. The apparatus of claim 47 further comprising:

the first insert forming a discharge footprint on the electrode surface facing an opposed electrode.

49. The apparatus of claim 47 further comprising:

a second insert contained within the electrode body in thermal conductivity communication with the first insert, the second insert comprising a substantial portion of the interior of the electrode body but less than about fifty percent.

50. The apparatus of claim 48 further comprising:

a second insert contained within the electrode body in thermal conductivity communication with the first insert, the second insert comprising a substantial portion of the interior of the electrode body but less than about fifty percent.

51. The apparatus of claim 49 further comprising:

the second insert being rectilinear in cross section.

52. The apparatus of claim 50 further comprising:

the second insert being rectilinear in cross section.

53. The apparatus of claim 47 further comprising:

a second insert contained within the electrode body in thermal conductivity communication with the first insert, the second insert comprising substantially all of the interior of the electrode body.

54. The apparatus of claim 48 further comprising:

a second insert contained within the electrode body in thermal conductivity communication with the first insert, the second insert comprising substantially all of the interior of the electrode body.

55. The apparatus of claim 53 further comprising:

the second insert having a shape that substantially matches that of the electrode body.

56. The apparatus of claim 54 further comprising:

the second insert having a shape that substantially matches that of the electrode body.

57. The apparatus of claim 47 further comprising:

the electrode body and the first insert are molecularly bonded.

58. The apparatus of claim 48 further comprising:

the electrode body and the first insert are molecularly bonded.

59. The apparatus of claim 49 further comprising:

the electrode body and the first and second inserts are molecularly bonded.

60. The apparatus of claim50 further comprising:

the electrode body and the first and second inserts are molecularly bonded.

61. The apparatus of claim 51 further comprising:

the electrode body and the first and second inserts are molecularly bonded.

58. The apparatus of claim48 further comprising:

the electrode body and the first and second inserts are diffusion bonded.

59. The apparatus of claim 49 further comprising:

the electrode body and the first and second inserts are diffusion bonded.

60. The apparatus of claim 50 further comprising:

the electrode body and the first and second inserts are diffusion bonded.

61. The apparatus of claim 51 further comprising:

the electrode body and the first and second inserts are diffusion bonded.

62. The apparatus of claim 52 further comprising:

the electrode body and the first and second inserts are diffusion bonded.

63. A gas discharge laser having a laser gas containing fluorine, comprising:

a gas discharge electrode comprising:

a thin film of semi-conductive material coating at least the discharge footprint of the gas discharge electrode.

64. The apparatus of claim 63 further comprising:

the semi-conductive material is a metallic oxide.

65. The apparatus of claim 64 further comprising:

the metallic oxide is one selected from the group of zinc oxide, lead oxide and Sn02.

66. A method of forming bi-metallic fluorine gas discharge laser electrode comprising:

diffusion bonding a first piece of a first material to a second piece of a second material utilizing a diffusion bonding catalyst between the first piece of material and the second piece of material during the diffusion bonding step; and,

machining the bonded pieces to form an electrode.

67. A method of forming bi-metallic fluorine gas discharge electrodes comprising:

diffusion bonding a first piece of a first material to a second piece of a second material utilizing an adhesion layer between the first piece of material and the second piece of material during the diffusion bonding step; and,

machining the bonded pieces to form an electrode.

68. A method of forming bi-metallic fluorine gas discharge laser electrodes comprising:

diffusion bonding a first piece of a first material to a second piece of a second material coating at least one of the surfaces to be bonded with an adhesion layer prior to the diffusion bonding step; and,

machining the bonded pieces to form an electrode.

69. The method of claim 67 further comprising:

roughing the surface of at least one of the pieces to be bonded prior to using the diffusion catalyst.

70. The Method of claim 68 further comprising:

roughing the surface of at least one of the pieces to be bonded prior to applying the adhesion coating.